THE ENGINEERING WEB

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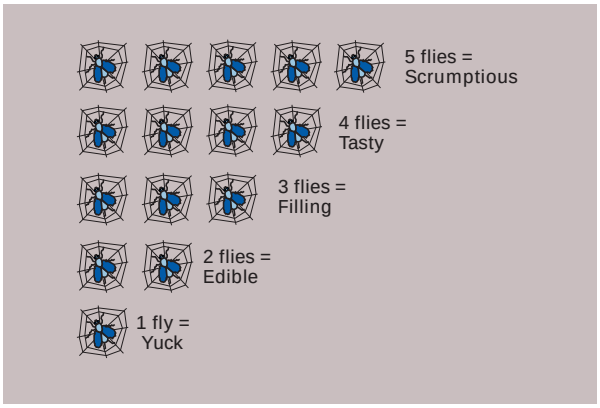
The Arachnoid Tourist scours the Net to find and review Web sites of interest to our readers. What makes a site interesting? Noteworthy sites offer useful technical information, provide tools that can actually be used in the engineering process, or illustrate how to develop better Internet applications.



The Tourist *appreciates style but cares most about content. Each issue, our tour guides—one from industry and one from academe—visit five to 10 sites, reporting on what they find, how well it works, and if the site merits your attention. We welcome your suggestions for places to visit. You can contact us through* IC Online.

VIRTUAL LIBRARIES

NIST Virtual Library

http://nvl.nist.gov
Visited: December 11, 1996

Not too long ago the library was *the* place where human knowledge was collected: a font of information to which we made pilgrimages to search the stacks. Internet technology is changing that. We often find more from computerized searches at home than from turning pages in the reading room. Conventional libraries must react to this changing environment.

This site represents the library of the National Institute of Standards and Technology. The homepage provides access to subject guides, various electronic databases, electronic journal abstracts and contents, reference pages, and technology services. As befits a "library" organizational model, some of the pages are for NIST personnel only.

***Bob*:** I liked this site, perhaps because it has such a variety of connections to the rest of the world. I found myself reading a chemical handbook, the *Scientific American* on aging and epilepsy, and the new law on "fasteners" (aka bolts and screws)—all from a few simple clicks on the home page. I'll add it to my bookmarks.

Presumably, the emerging model for the virtual library will include both organizing links and clever searches. The NIST library does well on the first criterion but fails to pass the second: I didn't have the patience to run the search engines to completion.

NIST is most famous for its standards. While you can purchase many of the standards documents at the site, I was disappointed that full texts are not available online. I can understand charging to cover printing costs, but NIST could help the standardization effort considerably, at little actual cost (though perhaps considerable revenue decline), by putting the standards online.

***Feniosky*:** This is a good library interface, with a very good collection of related sites. The only problem I had was with the search mechanisms. You can do a full search of the NIST site itself (actually, it takes a long time), but you can't search the contents of the library, since the site's search tool can't search the links connected to the site.

To actually function as a library, this site needs the equivalent of a good librarian—someone who can tell you where to look when you need something. Right now you have to search each site, which is clearly too time-consuming. Perhaps NIST can create a search tool that encompasses the sites it references—but of course it should only encompass those sites and not any of their links or things would get out of hand. Now you can see why electronic libraries are still such a challenge.

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CATALOGS AND DIRECTORIES

Thomas Register of American Manufacturers

http://www.thomasregister.com
Visited: December 11, 1996

The Thomas Register is a "traditional" directory of information about manufacturing products. The Web page claims comprehensive coverage of 55,000 products.

***Bob*:** I'm not impressed by transferring the traditional catalog to the Web. Overall, the site does not take advantage of the search possibilities of the Internet so much as reprint the existing paper directory. I'm also less than overwhelmed by the comprehensiveness of the register. My search for "computers" turned up only 50-odd listings, most of which seemed to be for retail outlets and only one of which was a manufacturer I'd heard of (Tandem). "Computers" in the Thomas Registry evidently doesn't include IBM, HP, or Sun. Finally, I was annoyed at the choice of running the server on a nonstandard port (8000), which caused the firewall on one of my systems to hiccup.

***Feniosky*:** This directory reincarnates the print version, providing information on how to contact manufacturers. I found, however, that a manufacturer's online catalog was often either unavailable or associated with the parent company, not the local representative being referenced. The search tended to be slow and the selection not straightforward. A search for "gear" got me 286 sites in Massachusetts, but some of the companies did not list gears among their products. Perhaps the search engine uses synonyms, or perhaps the displayed information is less comprehensive than the information the system searches on.

DesignInfo

http://www.designinfo.com
Visited: December 11, 1996

This site presents "searchable engineering catalogs on the Net." It features "parametric searches" that allow specification of the desired properties of an object to retrieve a list of vendor links.

***Bob*:** This is a nice contrast to the Thomas Register. Rather than a simple transposition of a paper catalog, we have an early attempt at a search engine by the characteristics of the problem to be solved. A further piece of cleverness: Failed searches show which clauses produced no (or few) matches. The catalog collection is less than comprehensive, but I like the approach.

***Feniosky*:** This type of search uses parameters instead of keywords to find a close match together with a point-and-click selection method, which can require a lot of browsing before you actually find something: Finding information through synonyms to a parameter is difficult. The catalog is limited, and the point-and-click method will make the search hard to manage when the data behind the site grows.

TOOLS

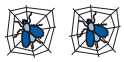
Servo Sizing CGI Resource

http://pmdi.com/php2.php/
Author: Mile Erlic, Precision MicroDynamics, Inc.
Visited: December 10, 1996

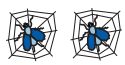
This page presents a gear-motor sizing program from Precision MicroDynamics, a vendor of "motion-control products." The servo-sizing program takes form-based inputs describing the load, gear box, motor, and ambient conditions. Then it computes the armature current drawn by the motor, motor-winding temperature, voltage, and system time constant. The system also plots the motor's speed, current, power, and efficiency versus torque curves.

***Bob*:** This is a typical example of the "engineering design" (and other computational) tools we're seeing these days on the Web. It's a good trend, in that it extends the notion of information beyond static words on a page to include the computational consequences of data. Tools such as this should be used with caution, however. Engineering skill is not merely in operating tools that compute values but, more importantly, in knowing what questions to ask and when the problem is an exception to the usual rules.

I give the site credit for innovative use of the Web. It might be useful to engineers who are doing a one-time, noncritical gear-motor system or whose specialty is not gear-motor systems, or to engineers who are exploring the gear-motor decision space. But I'd like to see more proof of its validity before I'd trust the output. (As a side note, the graphical output came back in some "nonstandard" form that my browser couldn't display.)



***Feniosky*:** This site might be useful to someone working with gears but, as the disclaimer states, there is no assurance that the results will be accurate. This tool represents an early version of something we will see more of in the future: using the Internet for remote processing and sharing of computational resources.



Online Map Creation: The OMC Input Form

http://www.aquarius.geomar.de/omc/make_map.html
Author: Martin Weinelt
Visited: November 4, 1996

Generic Mapping Tools are parameterized, Unix-based software developed by Wessel and Smith for creating maps of the Earth's surface. This page invokes some of GMT's functionality to draw a variety of maps. The system can create a variety of projections such as Mercator, equidistant cylindrical, polar stereographic, Lambert azimuthal, and orthographic. It also displays features such as topography, national and state boundaries, and geological data such as plate boundaries, fracture zones, and faults.

***Bob*:** This site offers a useful tool for a variety of scientific applications and an interesting demonstration of the coming model for delivering software over the Web. Both scientists and students can use it for practical applications like mapping fault lines and topography, but it's also just a lot of fun to play with.

***Feniosky*:** This is a very good site for creating maps and demonstrating an interactive connection to a program, and it also includes a user interface to the map generator. There are some problems. It takes several minutes to get a reasonably complicated map, and going from one page to another can take a long time. Also, you can't select a map by place name. Instead you must type in the latitudes and longitudes that bound the desired area. These numbers may not be so straightforward for a casual user.

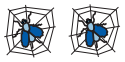
MANUFACTURING

AMII Acorn Demo

http://kingkong.me.berkeley.edu/amii.demo.html
Visited: November 4, 1996

Acorn is a DARPA-funded effort in the Agile Manufacturing Information Infrastructure project, which seeks to demonstrate engineering design and manufacturing services via the Internet. This page presents two demos: one shows the use of destructive solid geometry constraints in Pro/Engineer for part design, processing planning, and (presumably) fabrication; the other, remote access of archived machining data and comparisons of simulated predictions of milling forces and surface errors to actual force measurements.

***Bob*:** I confess to a lot of ignorance about actual machining of parts. I learned a bit from this site, but the presentation was confusing. Links that jumped off to other sites were not clearly distinguished from local ones. I had a hard time finding the demos, and when I did, the Java failed on security violations (though this may have been a feature of my local firewall.) It may be perfectly wonderful, though, if you're into comparing machining simulations to actual force measurements.



***Feniosky*:** The site provides in electronic format what you would find in print with the exception of some videos. The information is relevant for people looking into manufacturing and also serves the purpose of publishing research results quickly. However, it needs better layout, more uniform presentation, and most important, a way to push the envelope on how information should be shared.

WEB DESIGN

Alertbox: Current Issues in User Interface Design

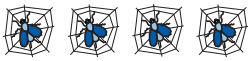
http://www.sun.com/columns/alertbox.html
Visited: November 3, 1996

This URL presents columns written by Jakob Nielsen, Sun Microsystems Distinguished Engineer and author of several books on user-interface design. Topics range from organizing pages into a Web site to providing access for disabled users.

***Bob*:** Nielsen's columns are opinionated and full of erudition and useful advice. Consider, for example, his advice on organizing collections of Web pages:

> Single pages are obviously not sufficient as a structuring mechanism, and from the early days of the Web, I have advocated an emphasis on the site as an additional fundamental structuring unit. Since a single click can take the user to the other end of the world, every page needs to provide users with a sense of place and tell them where they have landed. . . . Explicit recognition of the site as a structuring mechanism is important for Web usability, but most Web sites are much too large for the site level to provide the only structure. . . .

This is someone who has given consideration not only to how things look but to how they will be used. While he doesn't have an elaborated theory of "the new tricks for the new medium," these columns suggest why the latest great idea in Web design isn't likely to work in practice.



***Feniosky*:** Of course this site is very subjective—what somebody likes and dislikes in Web interface design. I liked the Most Popular Columns list, which gives an idea of the columns most important to a majority of viewers, but the number of hits for each article is missing, so you can't determine the threshold of hits it takes to be on the list.